Project LEAP

Learning and Environmental Awareness Partnership

Unit 6

Grades 3 - 4

Review
3 - 4

UNIT 6

Module Review

Subject Areas: Environmental Studies; Health; History; Science; Social Studies

Learning Objectives: Students will review and be tested on concepts learned throughout the Air Module. Students will also have the opportunity to test their knowledge of the subject matter in activities designed to draw on concepts from various units.

Vocabulary: No new vocabulary will be used in this unit.

LEARNING AND ENVIRONMENTAL AWARENESS PARTNERSHIP

Air Module Review

Units 1 - 5

A. Word Scramble: *(2 points each)*

Unscramble the letters below to form vocabulary words.

neeyrozola _ _ _ _ _ _ _ _ _ _

ofeluib _ _ _ _ _ _ _

dcai nira _ _ _ _ _ _ _ _

dkkewmie _ _ _ _ _ _ _ _

noracb xiedodi _ _ _ _ _ _ _ _ _ _ _ _ _

B. Multiple Choice: *(1 point each)*

1. Where is the "good" ozone layer located?

A. Troposphere B. Mesosphere C. Stratosphere

2. What does the good ozone layer protect the earth from?

A. The sun B. Ozone C. Ultraviolet radiation

3. Which of the following appliances in your house could have CFCs in them?

A. Stoves B. Refrigerators C. Televisions

4. Skin cancer, eye cataracts and crop damage can all be caused by what?

A. Ground-level ozone B. Ultraviolet radiation C. Temperature Inversions

5. Partners for Clean Air and the Indianapolis Knozone Program are examples of what kind of program?

A. Voluntary reduction B. Citizen action C. Both A and B

6. Originally used to describe a mixture of smoke and fog, which term is now used to describe a common summertime air pollution problem found in Indiana?

A. Ozone B. Smog C. Ozone Action Days

7. Each day, you breath how much air?
A. 10 lbs. B. 50 lbs. C. 35 lbs.

8. Acid rain is formed by the mixing of water and what chemical?
A. Nitrogen B. Sulfur dioxide C. Carbon Monoxide

9. Lightening and forest fires are types of natural sources of air pollution. What is another possible source?
A. Volcanoes B. Tornadoes C. Plants

10. The pH scale ranges from 0 to 14. An acid has what pH?
A. >7 B. 7 C. < 7

11. Which category of air pollution sources doesn't move around and is easier to count emissions from?
A. Mobile sources B. Point sources C. Non-road sources

12. This form of pollution can come from dust, soot or even paved roads.
A. Dirt B. Smoke C. Particulate

13. You can help reduce air pollution on high ozone days by doing which of the following?
A. Riding your bike B. Painting C. Fishing

14. Over which country can you find one of the holes in the protective ozone layer?
A. Australia B. Egypt C. Spain

15. Glues in plywood and pressed wood products contain what kind of chemical that can contribute to indoor air pollution?
A. Nitrogen dioxide B. Formaldehyde C. Asbestos

16. This is the second largest ingredient of air.
A. Nitrogen B. Pollution C. Oxygen

17. What are the air pollution standards called that protect human life?
A. Primary standards B. Health standards C. Life standards

18. What was the name of the 1963 federal regulations that gave state and local governments directions on how to begin cleaning up the air?
A. Clean Air Act B. National Pollution Act C. Federal Air Act

19. What kind of air pollution can prevent your body from getting the oxygen it needs to survive?
A. Lead B. Asbestos C. Carbon monoxide

20. What was the international treaty designed to eliminate the production of most CFCs called?
A. Montreal Protocol B. Detroit Protocol C. New York Protocol

C. True or False: *(1 point each)*

1. North America has an ozone hole located over it.
True or False

2. Countries that don't use CFCs will not be affected by ozone holes.
True or False

3. An ozone hole is actually a thin area of the protective ozone layer.
True or False

4. Ground-level or "bad" ozone molecules are the same as "good" ozone found in the protective ozone layer.
True or False

5. Certain lung diseases and conditions can be made worse by ground-level ozone.
True or False

6. Indiana does not have temperature inversions.
True or False

7. The atmosphere extends about 120 kilometers or 75 miles above the earth's surface.
True or False

8. Smog in Indiana is released directly into the air by factories and point sources.
True or False

9. When breathed in, sulfur dioxide can bother your lungs and hurt people with lung disease or respiratory problems.
True or False

10. Lemon juice is basic.
True or False

11. The United States Environmental Protection Agency (US EPA) adopted a new national ozone standard in 1997.

True or False

12. You can always see air pollution.

True or False

13. Most of Indiana's air pollution comes from large, point sources like factories.

True or False

14. Ground-level ozone is a problem for only four areas of Indiana.

True or False

15. Topography or land features can affect how air pollution moves around Indiana.

True or False

16. Alternative fuels are available for cars, trucks and buses that produce little or no air pollution.

True or False

17. Coal, oil, gasoline and natural gas are all fossil fuels.

True or False

18. Cars and trucks release about 50% of the volatile organic compounds (VOCs) in Indiana's air each year.

True or False

19. It is better to not use the drive-thru on days when ozone levels are high.

True or False

20. Coal is a fossil fuel that is called a renewable energy source.

True or False

D. Word Match: *(2 point each)*

Ground-level Ozone	Criteria Pollutants
Nitrogen	Greenbelt
Oil	Dobson Unit
Methane	Air pollution monitors
Non-road sources	Compressed Natural Gas (CNG)
Ozone Action Days	Acid rain
Coal	Atmosphere
Non-renewable energy	Oxygen
Thermosphere	Troposphere
Lead	Carbon Monoxide
Buffers	Solar
Gasoline	

1. _____ is the most important natural and manmade greenhouse gas.

2. _____ and _____ are two examples of fossil fuels which can release pollutants when used to make energy.

3. Cities and towns can use _____ to help reduce the air pollution because the trees, shrubs and vegetation use up extra carbon dioxide and catch pollutants.

4. Some alternative vehicles use _____ because it releases no pollutants to air when burned, other than water vapor.

5. _____ can not be regenerated or reused.

6. The _____ is the layer of air which surrounds the earth.

7. _____ can cause health problems for people, plants and animals because it can destroy living cells.

8. During the summer months, local or state officials may call an _____ to alert people to the need to help reduce air pollution.

9. Indiana is one of the top three _____ producers in the United States.

10. CFCs created in the _____ can work their way up to the “good” ozone layer.

11. _____ and _____ are the two most common gases in the earth’s atmosphere.

12. _____ is a kind of air pollution source which can be hard to count and include small engines like weed eaters.

13. A _____ is used as the measurement of the ozone layer's thickness.

14. The pH of _____ can affect the plant life, aquatic life and buildings and monuments.

15. IDEM is required to monitor for six primary pollutants called _____.

16. _____ and _____ are two of the dirty six pollutants.

17. The earth's atmosphere has four layers. The layer where temperatures can get as high as 1000^{o}F is called the _____.

18. Miners used canaries as natural _____ in the 1800's.

19. Because of the limestone in Indiana's soil, the soil _____ the pH of acid rain and helps reduce the effect on plants.

20. _____ energy can be used to fuel cars and homes.

E. Essay: *(10 points)*

Write a list of four things you or some one you know can do to help reduce "bad" or ground-level ozone.

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

Air Module Review
Units 1 - 5
ANSWER KEY

A. Word Scramble: *(2 points each)*

Unscramble the letters below to form vocabulary words.

neeyrozola	OZONE LAYER
ofeluib	BIOFUEL
dcai nira	ACID RAIN
dkkewmie	MILKWEED
noracb xiedodi	CARBON DIOXIDE

B. Multiple Choice: *(1 point each)*

1. Where is the "good" ozone layer located?
C. Stratosphere

2. What does the good ozone layer protect the earth from?
C. Ultraviolet radiation

3. Which of the following appliances could have CFCs in them?
B. Refrigerators

4. Skin cancer, eye cataracts and crop damage can all be caused by what?
B. Ultraviolet radiation

5. Partners for Clean Air and the Indianapolis Knozone Program are examples of what kind of program?
C. Both A and B

6. Originally used to describe a combination of smoke and fog, which term is now used to describe a common summertime air pollution problem found in Indiana?
B. Smog

7. Each day, you breath how much air?
C. 35 lbs.

8. Acid rain is formed by the mixing of water and what chemical?
B. Sulfur dioxide

9. Lightening and forest fires are examples of natural sources of air pollution. What is another possible source?
A. Volcanoes

10. The pH scale ranges from 0 to 14. An acid has what pH?
C. < 7

11. Which category of air pollution sources doesn't move around and is easier to count emissions from?
B. Point sources

12. This form of pollution can come from dust, soot or even paved roads.
C. Particulate

13. You can help reduce air pollution on high ozone days by doing which of the following?
A. Riding your bike

14. Over which country can you find one of the holes in the protective ozone layer?
A. Australia

15. Glues in plywood and pressed wood products contain what kind of chemical that can contribute to indoor air pollution?
B. Formaldehyde

16. This is the second largest component of air.
C. Oxygen

17. What are the air pollution standards called that protect human life?
A. Primary standards

18. What was the name of the 1963 federal regulations that gave state and local governments directions on how to begin cleaning up the air?
A. Clean Air Act

19. What kind of air pollution can prevent your body from getting the oxygen it needs to survive?
C. Carbon monoxide

20. What was the international treaty designed to eliminate the production of most CFCs called?
A. Montreal Protocol

C. True or False: *(1 point each)*

1. North America has an ozone hole located over it.
True

2. Countries that don't use CFCs will not be affected by ozone holes.
False

3. An ozone hole is actually a thin area of the protective ozone layer.
True

4. Ground-level ozone molecules are the same as ozone found in the protective ozone layer.
True

5. Certain lung diseases and conditions can be made worse by ground-level ozone.
True

6. Indiana does not have temperature inversions.
False

7. The atmosphere extends about 120 kilometers or 75 miles above the earth's surface.
True

8. Smog in Indiana is emitted directly into the air by factories and point sources.
False

9. When breathed in, sulfur dioxide can irritate your lungs and hurt people with lung disease or respiratory problems.
True

10. Lemon juice is basic.
False

11. The United States Environmental Protection Agency (US EPA) adopted a new national ozone standard in 1997.
True

12. You can always see air pollution.
False

13. Most of Indiana's air pollution comes from large, point sources like factories.
False

14. Ground-level ozone is a problem for only four areas of Indiana.
False

15. Topography can affect how air pollution moves around Indiana.
True

16. Alternative fuels are available for cars, trucks and buses that produce little or no air pollution.
True

17. Coal, oil, gasoline and natural gas are all considered fossil fuels.
True

18. Cars and trucks account for about 50% of the volatile organic compounds (VOCs) released into Indiana's air each year.
True

19. It is better to not use the drive-thru on days when ozone levels are high.
True

20. Coal is a fossil fuel that is considered to be a renewable energy source.
False

D. Word Match: *(2 points each)*

Ground-level Ozone	Criteria Pollutants
Nitrogen	Greenbelt
Oil	Dobson Unit
Methane	Air pollution monitors
Non-road sources	Compressed Natural Gas (CNG)
Ozone Action Days	Acid rain
Coal	Atmosphere
Non-renewable energy	Oxygen
Thermosphere	Troposphere
Lead	Carbon Monoxide
Buffers	Solar
Gasoline	

1. *Methane* is one of the most important natural and manmade greenhouse gas.

2. *Gasoline* and *oil* are two examples of fossil fuels which can release pollutants when used to make energy.

3. Cities and towns can use *greenbelts* to help reduce the air pollution because the trees, shrubs and vegetation use up excess carbon dioxide and catch pollutants.

4. Some alternative vehicles use *compressed natural gas (CNG)* because it releases no pollutants to air when burned, other than water vapor.

5. *Non-renewable energy* can not be regenerated or reused.

6. The *atmosphere* is the layer of air which surrounds the earth.

7. *Ground-level ozone* can cause health problems for people, plants and animals because it can destroy living cells.

8. During the summer months, local or state officials may call an *Ozone Action Day* to alert people to the need to help reduce air pollution.

9. Indiana is one of the top three *coal* producers in the United States.

10. CFCs created in the *troposphere* can work their way up to the “good” ozone layer.

11. *Nitrogen* and *oxygen* are the two most common gases in the earth’s atmosphere.

12. *Non-road sources* is a category of air pollution sources which can be hard to count and include small engines like weed eaters.

13. A *Dobson Unit* is used as the basic measurement of the ozone layer’s thickness.

14. The pH of *acid rain* can affect the plant life, aquatic life and buildings and monuments.

15. IDEM is required to monitor for six primary pollutants called *criteria pollutants*.

16. *Carbon monoxide* and *lead* are two of the dirty six pollutants.

17. The earth's atmosphere has four layers. The layer where temperatures can get as high as 1000ºF is called the *thermosphere*.

18. Miners used canaries as natural *air pollution monitors* in the 1800's.

19. Because of the limestone in Indiana's soil, the soil *buffers* the pH of acid rain and helps reduce the effect on plants.

20. *Solar* energy can be used to fuel cars and homes.

E. Essay: *(10 points)*

Write a list of four things you or some one you know can do to help reduce "bad" or ground-level ozone.

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

Project LEAP

Learning and Environmental Awareness Partnership

Unit 6

Grades 5 - 6

UNIT 6

Module Review

Subject Areas: Environmental Studies; Health; History; Science; Social Studies

Learning Objectives: Students will review and be tested on concepts learned throughout the Air Module. Students will also have the opportunity to test their knowledge of the subject matter in activities designed to draw on concepts from various units.

Vocabulary: No new vocabulary will be used in this unit.

Air Module Review

Units 1 - 5

A. Multiple Choice: *(1 point each)*

1. Where is the "good" ozone layer located?
A. Troposphere B. Mesosphere C. Stratosphere

2. What does the good ozone layer protect the earth from?
A. The sun B. Ozone C. Ultraviolet radiation

3. Which of the following appliances could have CFCs in them?
A. Stoves B. Refrigerators C. Televisions

4. Skin cancer, eye cataracts and crop damage can all be caused by what?
A. Ground-level ozone B. Ultraviolet radiation C. Temperature Inversions

5. Partners for Clean Air and the Indianapolis Knozone Program are examples of what kind of program?
A. Voluntary reduction B. Citizen action C. Both A and B

6. Originally used to describe a combination of smoke and fog, which term is now used to describe a common summertime air pollution problem found in Indiana?
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7. Each day, you breath how much air?
A. 10 lbs. B. 50 lbs. C. 35 lbs.

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11. Which category of air pollution sources doesn't move around and is easier to count emissions from?
A. Mobile sources B. Point sources C. Non-road sources

12. This form of pollution can come from dust, soot or even paved roads.
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13. You can help reduce air pollution on high ozone days by doing which of the following?
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14. Over which country can you find one of the holes in the protective ozone layer?
A. Australia B. Egypt C. Spain

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A. Nitrogen dioxide B. Formaldehyde C. Asbestos

16. This is the second largest component of air.
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A. Lead B. Asbestos C. Carbon monoxide

20. What was the international treaty designed to eliminate the production of most CFCs called?
A. Montreal Protocol B. Detroit Protocol C. New York Protocol

B. True or False: *(1 point each)*

1. North America has an ozone hole located over it.
True or False

2. Countries that don't use CFCs will not be affected by ozone holes.
True or False

3. An ozone hole is actually a thin area of the protective ozone layer.
True or False

4. Ground-level ozone molecules are the same as ozone found in the protective ozone layer.
True or False

5. Certain lung diseases and conditions can be made worse by ground-level ozone.
True or False

6. Indiana does not have temperature inversions.
True or False

7. The atmosphere extends about 120 kilometers or 75 miles above the earth's surface.
True or False

8. Smog in Indiana is emitted directly into the air by factories and point sources.
True or False

9. When breathed in, sulfur dioxide can irritate your lungs and hurt people with lung disease or respiratory problems.
True or False

10. Lemon juice is basic.
True or False

11. The United States Environmental Protection Agency (US EPA) adopted a new national ozone standard in 1997.
True or False

12. You can always see air pollution.
True or False

13. Most of Indiana's air pollution comes from large, point sources like factories.
True or False

14. Ground-level ozone is a problem for only four areas of Indiana.
True or False

15. Topography can affect how air pollution moves around Indiana.
True or False

16. Alternative fuels are available for cars, trucks and buses that produce little or no air pollution.
True or False

17. Coal, oil, gasoline and natural gas are all considered fossil fuels.
True or False

18. Cars and trucks account for about 50% of the volatile organic compounds (VOCs) released into Indiana's air each year.
True or False

19. It is better to not use the drive-thru on days when ozone levels are high.
True or False

20. Coal is a fossil fuel that is considered to be a renewable energy source.
True or False

C. Word Match: *(2 points each)*

Ground-level Ozone	Criteria Pollutants
Nitrogen	Greenbelt
Oil	Dobson Unit
Methane	Air pollution monitors
Non-road sources	Compressed Natural Gas (CNG)
Ozone Action Days	Acid rain
Coal	Atmosphere
Non-renewable energy	Oxygen
Thermosphere	Troposphere
Lead	Carbon Monoxide
Buffers	Solar
Gasoline	

1. _____ is the most important natural and manmade greenhouse gas.

2. _____ and _____ are two examples of fossil fuels which can release pollutants when used to make energy.

3. Cities and towns can use _____ to help reduce the air pollution because the trees, shrubs and vegetation use up excess carbon dioxide and catch pollutants.

4. Some alternative vehicles use _____ because it releases no pollutants to air when burned, other than water vapor.

5. _____ can not be regenerated or reused.

6. The _____ is the layer of air which surrounds the earth.

7. _____ can cause health problems for people, plants and animals because it can destroy living cells.

8. During the summer months, local or state officials may call an _____ to alert people to the need to help reduce air pollution.

9. Indiana is one of the top three _____ producers in the United States.

10. CFCs created in the _____ can work their way up to the “good” ozone layer.

11. _____ and _____ are the two most common gases in the earth’s atmosphere.

12. _____ is a category of air pollution sources which can be hard to count and include small engines like weed eaters.

13. A _____ is used as the basic measurement of the ozone layer’s thickness.

14. The pH of _____ can affect the plant life, aquatic life and buildings and monuments.

15. IDEM is required to monitors for six primary pollutants called _____.

16. _____ and _____ are two of the dirty six pollutants.

17. The earth’s atmosphere has four layers. The layer where temperatures can get as high as 1000^{o}F is called the _____.

18. Miners used canaries as natural _____ in the 1800's.

19. Because of the limestone in Indiana’s soil, the soil _____ the pH of acid rain and helps reduce the effect on plants.

20. _____ energy can be used to fuel cars and homes.

D. Essay: *(5 points each)*

1. Discuss the five source categories on the Wheel of Sources (mobile, residential, non-road, area, industrial). Discuss the differences between each and give examples of each.

2. Where does acid rain come from and what are some possible solutions?

3. If all of the countries in the world stopped producing chlorofluorocarbons (CFCs) today, why wouldn't the holes in the protective ozone layer disappear immediately?

4. Why does ground-level ozone form mainly during summer months in Indiana?

Air Module Review
Units 1 - 5
ANSWER KEY

A. Multiple Choice: *(1 point each)*

1. Where is the "good" ozone layer located?
C. Stratosphere

2. What does the good ozone layer protect the earth from?
C. Ultraviolet radiation

3. Which of the following appliances could have CFCs in them?
B. Refrigerators

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C. 35 lbs.

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13. You can help reduce air pollution on high ozone days by doing which of the following?
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14. Over which country can you find one of the holes in the protective ozone layer?
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15. Glues in plywood and pressed wood products contain what kind of chemical that can contribute to indoor air pollution?
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16. This is the second largest component of air.
C. Oxygen

17. What are the air pollution standards called that protect human life?
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20. What was the international treaty designed to eliminate the production of most CFCs called?
A. Montreal Protocol

B. True or False: *(1 point each)*

1. North America has an ozone hole located over it.
True

2. Countries that don't use CFCs will not be affected by ozone holes.
False

3. An ozone hole is actually a thin area of the protective ozone layer.
True

4. Ground-level ozone molecules are the same as ozone found in the protective ozone layer.
True

5. Certain lung diseases and conditions can be made worse by ground-level ozone.
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6. Indiana does not have temperature inversions.
False

7. The atmosphere extends about 120 kilometers or 75 miles above the earth's surface.
True

8. Smog in Indiana is emitted directly into the air by factories and point sources.
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9. When breathed in, sulfur dioxide can irritate your lungs and hurt people with lung disease or respiratory problems.
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12. You can always see air pollution.
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13. Most of Indiana's air pollution comes from large, point sources like factories.
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14. Ground-level ozone is a problem for only four areas of Indiana.
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15. Topography can affect how air pollution moves around Indiana.
True

16. Alternative fuels are available for cars, trucks and buses that produce little or no air pollution.
True

17. Coal, oil, gasoline and natural gas are all considered fossil fuels.
True

18. Cars and trucks account for about 50% of the volatile organic compounds (VOCs) released into Indiana's air each year.
True

19. It is better to not use the drive-thru on days when ozone levels are high.
True

20. Coal is a fossil fuel that is considered to be a renewable energy source.
False

C. Word Match: *(2 point each)*

Ground-level Ozone	Criteria Pollutants
Nitrogen	Greenbelt
Oil	Dobson Unit
Methane	Air pollution monitors
Non-road sources	Compressed Natural Gas (CNG)
Ozone Action Days	Acid rain
Coal	Atmosphere
Non-renewable energy	Oxygen
Thermosphere	Troposphere
Lead	Carbon Monoxide
Buffers	Solar
Gasoline	

1. *Methane* is one of the most important natural and manmade greenhouse gas.

2. *Gasoline* and *oil* are two examples of fossil fuels which can release pollutants when used to make energy.

3. Cities and towns can use *greenbelts* to help reduce the air pollution because the trees, shrubs and vegetation use up excess carbon dioxide and catch pollutants.

4. Some alternative vehicles use *compressed natural gas (CNG)* because it releases no pollutants to air when burned, other than water vapor.

5. *Non-renewable energy* can not be regenerated or reused.

6. The *atmosphere* is the layer of air which surrounds the earth.

7. *Ground-level ozone* can cause health problems for people, plants and animals because it can destroy living cells.

8. During the summer months, local or state officials may call an *Ozone Action Day* to alert people to the need to help reduce air pollution.

9. Indiana is one of the top three *coal* producers in the United States.

10. CFCs created in the *troposphere* can work their way up to the "good" ozone layer.

11. *Nitrogen* and *oxygen* are the two most common gases in the earth's atmosphere.

12. *Non-road sources* is a category of air pollution sources which can be hard to count and include small engines like weed eaters.

13. A *Dobson Unit* is used as the basic measurement of the ozone layer's thickness.

14. The pH of *acid rain* can affect the plant life, aquatic life and buildings and monuments.

15. IDEM is required to monitors for six primary pollutants called *criteria pollutants*.

16. *Carbon monoxide* and *lead* are two of the dirty six pollutants.

17. The earth's atmosphere has four layers. The layer where temperatures can get as high as 1000^{o}F is called the *thermosphere*.

18. Miners used canaries as natural *air pollution monitors* in the 1800's.

19. Because of the limestone in Indiana's soil, the soil *buffers* the pH of acid rain and helps reduce the effect on plants.

20. *Solar* energy can be used to fuel cars and homes.

D. Essay: *(5 points each)*

The following information is offered as a general guide to possible solutions.

1. Discuss the five source categories on the Wheel of Sources (mobile, residential, non-road, area, industrial). Discuss the differences between each and give examples of each.

Mobile Sources *are air pollution sources on the move (e.g. cars, trucks, buses, semi-trucks, construction equipment)*
Residential Sources *are found around your house or apartment and result from daily activities (e.g. paint, spray paint, nail polish remover, aerosol cans)*
Non-road Sources *have small gas powered engines and are typically hard to count sources of pollution (e.g. weedeaters, lawn mowers, boats).*
Area Sources *produce small amounts of pollution individually, but combined can contribute a large portion to Indiana's air pollution problems (e.g. dry cleaners, gas stations).*
Industrial Sources *typically release large amounts of chemicals, particulates and gases (e.g. large factories, utility plants, industries).*

2. Where does acid rain come from and what are some possible solutions?

Acid rain is produced from air pollution. The smoke from burning oil, gasoline, coal and wood (fossil fuels) rise into the air. They mix with the water in the air to form acid rain. The main chemicals in the air pollution that create acid rain are sulfur dioxide (SO_2) and nitrogen oxides (NO_x).

Possible solutions to acid rain include new regulations or laws to reduce sulfur dioxide and nitrogen dioxide emissions. Washing coal and scrubbers are options for electric utilities. Turning off lights and reducing the amount of wasted electricity also helps.

3. If all of the countries in the world stopped producing chlorofluorocarbons (CFCs) today, why wouldn't the holes in the protective ozone layer disappear immediately?

CFC's in the atmosphere can stay unchanged for up to twenty (20) years. This means that even if CFC production stopped completely in the year 2000, it would be 2020 before all the CFC's in the atmosphere were destroyed.

4. Why does ground-level ozone form mainly during summer months in Indiana?

Indiana's ozone season begins May 1 and ends September 30 each year. Indiana receives more sunlight and has its highest temperatures combined with low wind speeds during summer. These weather conditions are necessary to create ozone. Ozone is created when nitrogen oxides, volatile organic compounds (VOCs) and sunlight combine.

Project LEAP

Learning and Environmental Awareness Partnership

Unit 6

Grades 7 - 8

Review
7 - 8

UNIT 6

Module Review

Subject Areas: Environmental Studies; Health; History; Science; Social Studies

Learning Objectives: Students will review and be tested on concepts learned throughout the Air Module. Students will also have the opportunity to test their knowledge of the subject matter in activities designed to draw on concepts from various units.

Vocabulary: No new vocabulary will be used in this unit.

Air Module Review

Units 1 - 5

A. Multiple Choice: *(1 point each)*

1. Where is the "good" ozone layer located?
A. Troposphere B. Mesosphere C. Stratosphere

2. What does the good ozone layer protect the earth from?
A. The sun B. Ozone C. Ultraviolet radiation

3. Which of the following appliances could have CFCs in them?
A. Stoves B. Refrigerators C. Televisions

4. Skin cancer, eye cataracts and crop damage can all be caused by what?
A. Ground-level ozone B. Ultraviolet radiation C. Temperature Inversions

5. Partners for Clean Air and the Indianapolis Knozone Program are examples of what kind of program?
A. Voluntary reduction B. Citizen action C. Both A and B

6. Originally used to describe a combination of smoke and fog, which term is now used to describe a common summertime air pollution problem found in Indiana?
A. Ozone B. Smog C. Ozone Action Days

7. Each day, you breath how much air?
A. 10 lbs. B. 50 lbs. C. 35 lbs.

8. Acid rain is formed by the mixing of water and what chemical?
A. Nitrogen B. Sulfur dioxide C. Carbon Monoxide

9. Lightening and forest fires are examples of natural sources of air pollution. What is another possible source?
A. Volcanoes B. Tornadoes C. Plants

10. The pH scale ranges from 0 to 14. An acid has what pH?
A. >7 B. 7 C. < 7

11. Which category of air pollution sources doesn't move around and is easier to count emissions from?
A. Mobile sources B. Point sources C. Non-road sources

12. This form of pollution can come from dust, soot or even paved roads.
A. Dirt B. Smoke C. Particulate

13. You can help reduce air pollution on high ozone days by doing which of the following?
A. Riding your bike B. Painting C. Fishing

14. Over which country can you find one of the holes in the protective ozone layer?
A. Australia B. Egypt C. Spain

15. Glues in plywood and pressed wood products contain what kind of chemical that can contribute to indoor air pollution?
A. Nitrogen dioxide B. Formaldehyde C. Asbestos

16. This is the second largest component of air.
A. Nitrogen B. Pollution C. Oxygen

17. What are the air pollution standards called that protect human life?
A. Primary standards B. Health standards C. Life standards

18. What was the name of the 1963 federal regulations that gave state and local governments directions on how to begin cleaning up the air?
A. Clean Air Act B. National Pollution Act C. Federal Air Act

19. What kind of air pollution can prevent your body from getting the oxygen it needs to survive?
A. Lead B. Asbestos C. Carbon monoxide

20. What was the international treaty designed to eliminate the production of most CFCs called?
A. Montreal Protocol B. Detroit Protocol C. New York Protocol

B. True or False: **(1 point each)**

1. North America has an ozone hole located over it.
True or False

2. Countries that don't use CFCs will not be affected by ozone holes.
True or False

3. An ozone hole is actually a thin area of the protective ozone layer.
True or False

4. Ground-level ozone molecules are the same as ozone found in the protective ozone layer.
True or False

5. Certain lung diseases and conditions can be made worse by ground-level ozone.
True or False

6. Indiana does not have temperature inversions.
True or False

7. The atmosphere extends about 120 kilometers or 75 miles above the earth's surface.
True or False

8. Smog in Indiana is emitted directly into the air by factories and point sources.
True or False

9. When breathed in, sulfur dioxide can irritate your lungs and hurt people with lung disease or respiratory problems.
True or False

10. Lemon juice is basic.
True or False

11. The United States Environmental Protection Agency (US EPA) adopted a new national ozone standard in 1997.
True or False

12. You can always see air pollution.
True or False

13. Most of Indiana's air pollution comes from large, point sources like factories.
True or False

14. Ground-level ozone is a problem for only four areas of Indiana.
True or False

15. Topography can affect how air pollution moves around Indiana.
True or False

16. Alternative fuels are available for cars, trucks and buses that produce little or no air pollution.
True or False

17. Coal, oil, gasoline and natural gas are all considered fossil fuels.
True or False

18. Cars and trucks account for about 50% of the volatile organic compounds (VOCs) released into Indiana's air each year.

True or False

19. It is better to not use the drive-thru on days when ozone levels are high.

True or False

20. Coal is a fossil fuel that is considered to be a renewable energy source.

True or False

C. Word Match: **(2 points each)**

Ground-level Ozone	Criteria Pollutants
Nitrogen	Greenbelt
Oil	Dobson Unit
Methane	Air pollution monitors
Non-road sources	Compressed Natural Gas (CNG)
Ozone Action Days	Acid rain
Coal	Atmosphere
Non-renewable energy	Oxygen
Thermosphere	Troposphere
Lead	Carbon Monoxide
Buffers	Solar
Gasoline	

1. _____ is the most important natural and manmade greenhouse gas.

2. _____ and _____ are two examples of fossil fuels which can release pollutants when used to make energy.

3. Cities and towns can use _____ to help reduce the air pollution because the trees, shrubs and vegetation use up excess carbon dioxide and catch pollutants.

4. Some alternative vehicles use _____ because it releases no pollutants to air when burned, other than water vapor.

5. _____ can not be regenerated or reused.

6. The _____ is the layer of air which surrounds the earth.

7. _____ can cause health problems for people, plants and animals because it can destroy living cells.

8. During the summer months, local or state officials may call an _____ to alert people to the need to help reduce air pollution.

9. Indiana is one of the top three _____ producers in the United States.

10. CFCs created in the _____ can work their way up to the “good” ozone layer.

11. _____ and _____ are the two most common gases in the earth’s atmosphere.

12. _____ is a category of air pollution sources which can be hard to count and include small engines like weed eaters.

13. A _____ is used as the basic measurement of the ozone layer’s thickness.

14. The pH of _____ can affect the plant life, aquatic life and buildings and monuments.

15. IDEM is required to monitors for six primary pollutants called _____.

16. _____ and _____ are two of the dirty six pollutants.

17. The earth’s atmosphere has four layers. The layer where temperatures can get as high as 1000^{o}F is called the _____.

18. Miners used canaries as natural _____ in the 1800's.

19. Because of the limestone in Indiana’s soil, the soil _____ the pH of acid rain and helps reduce the effect on plants.

20. _____ energy can be used to fuel cars and homes.

D. Essay: *(5 points each)*

1. Discuss the five source categories on the Wheel of Sources (mobile, residential, non-road, area, industrial). Discuss the differences between each and give examples of each.

2. Where does acid rain come from and what are some possible solutions?

3. If all of the countries in the world stopped producing chlorofluorocarbons (CFCs) today, why wouldn't the holes in the protective ozone layer disappear immediately?

4. Why does ground-level ozone form mainly during summer months in Indiana?

Air Module Review
Units 1 - 5
ANSWER KEY

A. Multiple Choice: *(1 point each)*

1. Where is the "good" ozone layer located?
C. Stratosphere

2. What does the good ozone layer protect the earth from?
C. Ultraviolet radiation

3. Which of the following appliances could have CFCs in them?
B. Refrigerators

4. Skin cancer, eye cataracts and crop damage can all be caused by what?
B. Ultraviolet radiation

5. Partners for Clean Air and the Indianapolis Knozone Program are examples of what kind of program?
C. Both A and B

6. Originally used to describe a combination of smoke and fog, which term is now used to describe a common summertime air pollution problem found in Indiana?
B. Smog

7. Each day, you breath how much air?
C. 35 lbs.

8. Acid rain is formed by the mixing of water and what chemical?
B. Sulfur dioxide

9. Lightening and forest fires are examples of natural sources of air pollution. What is another possible source?
A. Volcanoes

10. The pH scale ranges from 0 to 14. An acid has what pH?
C. < 7

11. Which category of air pollution sources doesn't move around and is easier to count emissions from?
B. Point sources

12. This form of pollution can come from dust, soot or even paved roads.
C. Particulate

13. You can help reduce air pollution on high ozone days by doing which of the following?
A. Riding your bike

14. Over which country can you find one of the holes in the protective ozone layer?
A. Australia

15. Glues in plywood and pressed wood products contain what kind of chemical that can contribute to indoor air pollution?
B. Formaldehyde

16. This is the second largest component of air.
C. Oxygen

17. What are the air pollution standards called that protect human life?
A. Primary standards

18. What was the name of the 1963 federal regulations that gave state and local governments directions on how to begin cleaning up the air?
A. Clean Air Act

19. What kind of air pollution can prevent your body from getting the oxygen it needs to survive?
C. Carbon monoxide

20. What was the international treaty designed to eliminate the production of most CFCs called?
A. Montreal Protocol

B. True or False: *(1 point each)*

1. North America has an ozone hole located over it.
    True

2. Countries that don't use CFCs will not be affected by ozone holes.
    False

3. An ozone hole is actually a thin area of the protective ozone layer.
    True

4. Ground-level ozone molecules are the same as ozone found in the protective ozone layer.
    True

5. Certain lung diseases and conditions can be made worse by ground-level ozone.
True

6. Indiana does not have temperature inversions.
False

7. The atmosphere extends about 120 kilometers or 75 miles above the earth's surface.
True

8. Smog in Indiana is emitted directly into the air by factories and point sources.
False

9. When breathed in, sulfur dioxide can irritate your lungs and hurt people with lung disease or respiratory problems.
True

10. Lemon juice is basic.
False

11. The United States Environmental Protection Agency (US EPA) adopted a new national ozone standard in 1997.
True

12. You can always see air pollution.
False

13. Most of Indiana's air pollution comes from large, point sources like factories.
False

14. Ground-level ozone is a problem for only four areas of Indiana.
False

15. Topography can affect how air pollution moves around Indiana.
True

16. Alternative fuels are available for cars, trucks and buses that produce little or no air pollution.
True

17. Coal, oil, gasoline and natural gas are all considered fossil fuels.
True

18. Cars and trucks account for about 50% of the volatile organic compounds (VOCs) released into Indiana's air each year.

True

19. It is better to not use the drive-thru on days when ozone levels are high.

True

20. Coal is a fossil fuel that is considered to be a renewable energy source.

False

C. Word Match: *(2 points each)*

Ground-level Ozone	Criteria Pollutants
Nitrogen	Greenbelt
Oil	Dobson Unit
Methane	Air pollution monitors
Non-road sources	Compressed Natural Gas (CNG)
Ozone Action Days	Acid rain
Coal	Atmosphere
Non-renewable energy	Oxygen
Thermosphere	Troposphere
Lead	Carbon Monoxide
Buffers	Solar
Gasoline	

1. *Methane* is one of the most important natural and manmade greenhouse gas.

2. *Gasoline* and *oil* are two examples of fossil fuels which can release pollutants when used to make energy.

3. Cities and towns can use *greenbelts* to help reduce the air pollution because the trees, shrubs and vegetation use up excess carbon dioxide and catch pollutants.

4. Some alternative vehicles use *compressed natural gas (CNG)* because it releases no pollutants to air when burned, other than water vapor.

5. *Non-renewable energy* can not be regenerated or reused.

6. The *atmosphere* is the layer of air which surrounds the earth.

7. *Ground-level ozone* can cause health problems for people, plants and animals because it can destroy living cells.

8. During the summer months, local or state officials may call an *Ozone Action Day* to alert people to the need to help reduce air pollution.

9. Indiana is one of the top three *coal* producers in the United States.

10. CFCs created in the *troposphere* can work their way up to the "good" ozone layer.

11. *Nitrogen* and *oxygen* are the two most common gases in the earth's atmosphere.

12. *Non-road sources* is a category of air pollution sources which can be hard to count and include small engines like weed eaters.

13. A *Dobson Unit* is used as the basic measurement of the ozone layer's thickness.

14. The pH of *acid rain* can affect the plant life, aquatic life and buildings and monuments.

15. IDEM is required to monitors for six primary pollutants called *criteria pollutants*.

16. *Carbon monoxide* and *lead* are two of the dirty six pollutants.

17. The earth's atmosphere has four layers. The layer where temperatures can get as high as 1000^{o}F is called the *thermosphere*.

18. Miners used canaries as natural *air pollution monitors* in the 1800's.

19. Because of the limestone in Indiana's soil, the soil *buffers* the pH of acid rain and helps reduce the effect on plants.

20. *Solar* energy can be used to fuel cars and homes.

D. Essay: *(5 points each)*

The following information is offered as a general guide to possible solutions.

1. Discuss the five source categories on the Wheel of Sources (mobile, residential, non-road, area, industrial). Discuss the differences between each and give examples of each.

Mobile Sources *are air pollution sources on the move (e.g. cars, trucks, buses, semi-trucks, construction equipment)*
Residential Sources *are found around your house or apartment and result from daily activities (e.g. paint, spray paint, nail polish remover, aerosol cans)*
Non-road Sources *have small gas powered engines and are typically hard to count sources of*

pollution (e.g. weedeaters, lawn mowers, boats).
***Area Sources** produce small amounts of pollution individually, but combined can contribute a large portion to Indiana's air pollution problems (e.g. dry cleaners, gas stations).*
***Industrial Sources** typically release large amounts of chemicals, particulates and gases (e.g. large factories, utility plants, industries).*

2. Where does acid rain come from and what are some possible solutions?

Acid rain is produced from air pollution. The smoke from burning oil, gasoline, coal and wood (fossil fuels) rise into the air. They mix with the water in the air to form acid rain. The main chemicals in the air pollution that create acid rain are sulfur dioxide (SO_2) and nitrogen oxides (NO_x).

Possible solutions to acid rain include new regulations or laws to reduce sulfur dioxide and nitrogen dioxide emissions. Washing coal and scrubbers are options for electric utilities. Turning off lights and reducing the amount of wasted electricity also helps.

3. If all of the countries in the world stopped producing chlorofluorocarbons (CFCs) today, why wouldn't the holes in the protective ozone layer disappear immediately?

CFC's in the atmosphere can stay unchanged for up to twenty (20) years. This means that even if CFC production stopped completely in the year 2000, it would be 2020 before all the CFC's in the atmosphere were destroyed.

4. Why does ground-level ozone form mainly during summer months in Indiana?

Indiana's ozone season begins May 1 and ends September 30 each year. Indiana receives more sunlight and has its highest temperatures combined with low wind speeds during summer. These weather conditions are necessary to create ozone. Ozone is created when nitrogen oxides, volatile organic compounds (VOCs) and sunlight combine.